misalignment can be discriminated by inspection and quantified by comparison with empiriocal or simulated data.

Page 19, line 2+:

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

REMARKS

Claims 1 - 12 remain active in this application. Minor editorial revisions have been made in the specification in the interest of clarity.

Specifically, the amendment to page 14 seeks to improve correspondence with the content of Figures 3 and 4; the amendment to page 15 is largely editorial in nature; and the amendment to page 19 is a trivial correction to properly refer to the joint inventors. Therefore, it is respectfully submitted that no new matter has been introduced into the application by the above amendment.

Early and favorable action is respectfully requested at an early date.

Respectfully submitted,

Marshall M. Curtis

Marshall M. Curtis
Reg. No. 33,138

McGuireWoods, LLP
1750 Tysons Boulevard, Suite 1800
McLean, Virginia 22102
(703) 712-5000 (Direct Dial (703) 712-5062)

APPENDIX

Page 14, line 15+:

A simulation of the FFT amplitude variation [with wavelength] of spectral reflectance data from the pattern of Figure 2A is shown in Figure 3 and a simulation of FFT amplitude variation [with wavelength] of spectral reflectance data from the pattern of Figure 2B is shown in Figure 4. It is assumed for purposes of this discussion that the differently shaded portions 22, 24 of Figure 2A (and 2B) have different reflectivity and that the marks include at least one mark which is of differing width. It is also assumed that illumination is with broadband light and that the reflected light is analyzed with a wavelength dispersive detector to provide a spectral curve of reflectivity (amplitude and phase) as a function of wavelength. The resulting curve will be similar in some respects to Figures 3 and 4 and can be processed to obtain the same overlay alignment information, as will be readily understood by those skilled in the art. The correctly aligned marks of Figure 2A are assumed to be of substantially constant pitch while two (or more) distinct pitches or spacings are exhibited by the misaligned marks of Figure 2B.

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Figure 3 shows a plurality of peaks of light amplitude at different frequencies or wavelengths (calibrated as a function of 1/pixel which is basically equivalent to inverse wavelength but specifically related by the calibration to multiples of lithographic tool resolution or minimum feature size). Sharp peaks 32 and broad peaks 34 are evident and are [an] dependent on incident [of] geometry, reflectivity and profile of individual lines. In Figure 3, both the sharp peaks and the broad peaks are substantially

symmetrical while in Figure 4, substantial asymmetry is evident, particularly in the broad peaks 42 and the sharp peaks 44 of longer wavelength. This asymmetry of peaks in Figure 4 is due to the different spacings caused by misalignment in the composite pattern of Figure 2B but is substantially absent from Figure 3 since the pitch of the marks is substantially constant. Thus, it is seen that the shape of the spectral curve is extremely sensitive to the existence of slight variation in spacing of a periodic structure (which would include features at a pluraity of pitches or periodic spacings due to any misalignment) and even small degrees of misalignment can be discriminated by inspection and quantified by comparison with empiriocal or simulated data.

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Having thus described [my] <u>our</u> invention, what [I] <u>we</u> claim as new and desire to secure by Letters Patent is as follows: